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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,130	04/08/2004	David C. Collins	200400519-1	8946
22879 7590 02/29/2008 HEWLETT PACKARD COMPANY P O BOX 272400, 3404 E. HARMONY ROAD INTELLECTUAL PROPERTY ADMINISTRATION FORT COLLINS, CO 80527-2400			EXAMINER SMITH, JEFFREY S	
			ART UNIT 2624	PAPER NUMBER
			NOTIFICATION DATE 02/29/2008	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/821,130	Applicant(s) COLLINS, DAVID C.	
	Examiner Jeffrey S. Smith	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 November 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-2, 4-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/ are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-29 are provisionally rejected on the ground of nonstatutory double patenting over claims 1-30 of copending Application No. 10/820,952 in view of "Super-Resolution Composition in Multi-Projector Displays" by Jaynes et al. ("Jaynes"). This is a provisional double patenting rejection since the conflicting claims have not yet been patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because (similar limitations are in bold) claim 1 of this application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values, and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

Claim 1 of the copending application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values and a plurality of error values, and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data, at least a second one of the plurality of sub-frame pixel values, and at least one of the plurality of error values; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify claim 1 of the copending application to remove the plurality of error values as taught by the disclosure of the copending application and as taught by Jaynes who shows in figure 4 that a sub-frame pixel value of a first sub-frame a depends on the pixel value of a second sub-frame pixel value b.

Claims 1-29 are provisionally rejected on the ground of nonstatutory double patenting over claims 1-29 of copending Application No. 10/864,125 in view of "Super-Resolution Composition in Multi-Projector Displays" by Jaynes et al. ("Jaynes"). This is a provisional double patenting rejection since the conflicting claims have not yet been

patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of this application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values, and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

Claim 1 of the copending application recites

A method of displaying an image with a display device, the method comprising: receiving first image data for the image, the first image data associated with a first color space; converting the first image data to second image data associated with a second color space; generating first and second sub-frames using the second image data; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

It would have been obvious to one of ordinary skill in the art at the time of invention to have first and second sub-frames of copending claim 1 comprise a plurality of sub-frame pixel values as taught by copending claim 11, and to have at least a first one of the plurality of sub-frame pixel values calculated using the image data and at least a second one of the plurality of sub-frame pixel values as taught by the figures and specification of the copending application and as taught by Jaynes who shows in figure 4 that a sub-frame pixel value of a first sub-frame a depends on the pixel value of a second sub-frame pixel value b.

Claims 1-29 are provisionally rejected on the ground of nonstatutory double patenting over claims 1-25 of copending Application No. 10/868,638 in view of "Super-Resolution Composition in Multi-Projector Displays" by Jaynes et al. ("Jaynes"). This is a provisional double patenting rejection since the conflicting claims have not yet been patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of this application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values, and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

Claim 1 of the copending application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image, the image data comprising a first portion and a second portion; generating a first plurality of sub-frames using the first portion and a first simulation kernel; generating a second plurality of sub-frames using the second portion and the first simulation kernel independently from generating the first plurality of sub-frames; and alternating between displaying a first one of the first plurality of sub-frames in a first position, displaying a second one of the first plurality of sub-frames in a second position spatially offset from the first position, displaying a first one of the second plurality of sub-frames in a third position spatially offset from the first and the second positions, and displaying a second one of the second plurality of sub-frames in a fourth position spatially offset from the first, the second, and the third positions.

It would have been obvious to one of ordinary skill in this art at the time of invention to have the first and second sub-frames of copending claim 1 to comprise a

plurality of sub-frame pixel values as implied by copending claim 3, and to have at least a first one of the plurality of sub-frame pixel values calculated using the image data and at least a second one of the plurality of sub-frame pixel values as implied by copending claim 3 and as taught by the figures and specification of the copending application and as taught by Jaynes who shows in figure 4 that a sub-frame pixel value of a first sub-frame a depends on the pixel value of a second sub-frame pixel value b.

Claims 1-29 are provisionally rejected on the ground of nonstatutory double patenting over claims 1-29 of copending Application No. 10/868,719 in view of "Super-Resolution Composition in Multi-Projector Displays" by Jaynes et al. ("Jaynes"). This is a provisional double patenting rejection since the conflicting claims have not yet been patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of this application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values, and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

Claim 1 of the copending application recites

A method of displaying images with a display device, the method comprising: receiving first image data associated with a first image; converting a portion of the first image data to zero values; generating a first set of three sub-frames using the first image data; and alternating between

displaying the first set of three sub-frames in first, second, and third positions, wherein the second position is spatially offset from the first position, and wherein the third position is spatially offset from the first and the second positions.

It would have been obvious to one of ordinary skill in this art at the time of invention to have the first and second of the three sub-frames of copending claim 1 to comprise a plurality of sub-frame pixel values and to have at least a first one of the plurality (which is three in this claim) of sub-frame pixel values calculated using the image data and at least a second one of the plurality of sub-frame pixel values as taught by the figures and specification of the copending application and as taught by Jaynes who shows in figure 4 that a sub-frame pixel value of a first sub-frame a depends on the pixel value of a second sub-frame pixel value b.

Claims 1-29 are provisionally rejected on the ground of nonstatutory double patenting over claims 1-27 of copending Application No. 10/992,926 in view of "Super-Resolution Composition in Multi-Projector Displays" by Jaynes et al. ("Jaynes"). This is a provisional double patenting rejection since the conflicting claims have not yet been patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of this application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values, and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

Claim 1 of the copending application recites

A method of displaying an image with a display device, the method comprising: generating a first sub-frame and a second sub-frame corresponding to image data for the image, wherein generating the first sub-frame includes calculating a first sub-frame pixel value in the first sub-frame using a first sharpening factor associated with a first plurality of gradients from the image data; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

It would have been obvious to one of ordinary skill in this art at the time of invention to have the first and second of the three sub-frames of copending claim 1 to comprise a plurality of sub-frame pixel values and to have at least a first one of the plurality of sub-frame pixel values calculated using the image data and at least a second one of the plurality of sub-frame pixel values as taught by the figures and specification of the copending application and as taught by Jaynes who shows in figure 4 that a sub-frame pixel value of a first sub-frame a depends on the pixel value of a second sub-frame pixel value b.

Claims 1-29 are provisionally rejected on the ground of nonstatutory double patenting over claims 1-32 of copending Application No. 10/750,591 in view of "Super-Resolution Composition in Multi-Projector Displays" by Jaynes et al. ("Jaynes"). This is a provisional double patenting rejection since the conflicting claims have not yet been patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of this application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and

second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values, and **wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data** and at least a second one of the plurality of sub-frame pixel values; **and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.**

Claim 1 of the copending application recites

A method of displaying an image with a display device having a set of defective display pixels, the method comprising: receiving image data for the image; generating a first sub-frame and a second sub-frame corresponding to the image data; and selecting a first position and a second position spatially offset from the first position, the first and the second positions selected based on positions of the defective display pixels and characteristics of a human visual system; and alternating between displaying the first sub-frame in the first position and displaying the second sub-frame in the second position.

It would have been obvious to one of ordinary skill in this art at the time of invention to have the first and the second sub-frames comprise a plurality of sub-frame pixel values, and at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values, as taught by the figures and specification of the copending application and as taught by Jaynes who shows in figure 4 that a sub-frame pixel value of a first sub-frame a depends on the pixel value of a second sub-frame pixel value b.

Claims 1-29 are provisionally rejected on the ground of nonstatutory double patenting over claims of copending Application No. 10/697,605 in view of "Super-Resolution Composition in Multi-Projector Displays" by Jaynes et al. ("Jaynes"). This is a provisional double patenting rejection since the conflicting claims have not yet been

patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of this application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values, and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

Claim 1 of the copending application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image on a high resolution grid; generating a first sub-frame and a second sub-frame corresponding to the image data, the first and the second sub-frames each generated on a low resolution diamond grid; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

It would have been obvious to one of ordinary skill in this art at the time of invention to have the first and the second sub-frames comprise a plurality of sub-frame pixel values, and at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values, as taught by the figures and specification of the copending application and as taught by Jaynes who shows in figure 4 that a sub-frame pixel value of a first sub-frame a depends on the pixel value of a second sub-frame pixel value b.

Claims 1-29 are provisionally rejected on the ground of nonstatutory double patenting over claims 1-42 of copending Application No. 10/696,888 in view of "Super-

Resolution Composition in Multi-Projector Displays" by Jaynes et al. ("Jaynes"). This is a provisional double patenting rejection since the conflicting claims have not yet been patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of this application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values, and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

Claim 1 of the copending application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image on a first type of grid; generating a first sub-frame and a second sub-frame corresponding to the image data, the first and the second sub-frames each generated on a second type of grid that is different than the first type of grid, wherein one of the first type of grid and the second type of grid is a non-rectangular grid; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

It would have been obvious to one of ordinary skill in this art at the time of invention to have the first and the second sub-frames comprise a plurality of sub-frame pixel values, and at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values, as taught by the figures and specification of the copending application and as taught by Jaynes who shows in figure 4 that a sub-frame pixel value of a first sub-frame a depends on the pixel value of a second sub-frame pixel value b.

Claims 1-29 are provisionally rejected on the ground of nonstatutory double patenting over claims 1-33 of copending Application No. 10/821,135 in view of "Super-Resolution Composition in Multi-Projector Displays" by Jaynes et al. ("Jaynes"). This is a provisional double patenting rejection since the conflicting claims have not yet been patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of this application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values, and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

Claim 1 of the copending application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image, the image data comprising a first set of pixels; generating first and second sub-frames, wherein the first and the second sub-frames comprise a second set of pixels, wherein each of the second set of pixels is centered relative to one of the first set of pixels; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

It would have been obvious to one of ordinary skill in this art at the time of invention to have at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values, as taught by the figures and specification of the copending application and

as taught by Jaynes who shows in figure 4 that a sub-frame pixel value of a first sub-frame a depends on the pixel value of a second sub-frame pixel value b.

Claims 1-29 are provisionally rejected on the ground of nonstatutory double patenting over claims 1-24 of copending Application No. 10/632,042 in view of "Super-Resolution Composition in Multi-Projector Displays" by Jaynes et al. ("Jaynes"). This is a provisional double patenting rejection since the conflicting claims have not yet been patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of this application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values, and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

Claim 1 of the copending application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image at a first resolution; generating a first sub-frame and a second sub-frame based on combinations of pixel values from the image data, the first and second sub-frames having a second resolution which matches the display device and each have an area equal to the image data; and controlling an image shifter to allow for alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position on the display device.

It would have been obvious to one of ordinary skill in this art at the time of invention to have the first and the second sub-frames comprise a plurality of sub-frame

pixel values, and at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values, as taught by the figures and specification of the copending application and as implied by claims 2-24 of the copending application and as taught by Jaynes who shows in figure 4 that a sub-frame pixel value of a first sub-frame a depends on the pixel value of a second sub-frame pixel value b.

Claims 1-29 are provisionally rejected on the ground of nonstatutory double patenting over claims 1-20 of copending Application No. 10/672,544 in view of "Super-Resolution Composition in Multi-Projector Displays" by Jaynes et al. ("Jaynes"). This is a provisional double patenting rejection since the conflicting claims have not yet been patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of this application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values, and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

Claim 1 of the copending application recites

A method of displaying images with a display device, the method comprising: receiving image data for a plurality of image frames; generating at least one sub-frame for each image frame based on the received image data; displaying the sub-frames for each image frame in a first set of the plurality of image frames at a first plurality of spatially offset positions; and displaying the sub-frames for each image frame in a second

set of the plurality of image frames at a second plurality of spatially offset positions that is different than the first plurality of spatially offset positions; and sequentially displaying a plurality of colors during the display of each of the sub-frames.

It would have been obvious to one of ordinary skill in this art at the time of invention to have the first and the second sub-frames comprise a plurality of sub-frame pixel values, and at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values, as taught by the figures and specification of the copending application and as taught by Jaynes who shows in figure 4 that a sub-frame pixel value of a first sub-frame a depends on the pixel value of a second sub-frame pixel value b.

Claims 1-29 are provisionally rejected on the ground of nonstatutory double patenting over claims 1-30 of copending Application No. 10/768,621 in view of "Super-Resolution Composition in Multi-Projector Displays" by Jaynes et al. ("Jaynes"). This is a provisional double patenting rejection since the conflicting claims have not yet been patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of this application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values, and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

Claim 1 of the copending application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating a plurality of sub-frames corresponding to the image data, the sub-frames generated based on a set of spatially offset sub-frame positions, a first function that represents a simulated high resolution image, and a second function that represents a desired high resolution image; and displaying the sub-frames at the set of spatially offset positions.

It would have been obvious to one of ordinary skill in this art at the time of invention to have the first and the second sub-frames comprise a plurality of sub-frame pixel values, and at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values, as taught by the figures and specification of the copending application and as taught by Jaynes who shows in figure 4 that a sub-frame pixel value of a first sub-frame a depends on the pixel value of a second sub-frame pixel value b.

Claims 1-29 are provisionally rejected on the ground of nonstatutory double patenting over claims 1-32 of copending Application No. 10/768,215 in view of "Super-Resolution Composition in Multi-Projector Displays" by Jaynes et al. ("Jaynes"). This is a provisional double patenting rejection since the conflicting claims have not yet been patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of this application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values, and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values; and alternating between displaying the first sub-frame in a first position and displaying the

second sub-frame in a second position spatially offset from the first position.

Claim 1 of the copending application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating a plurality of multiple-pixel image sub-frames corresponding to the image data; and displaying the sub-frames in a circularly shifted manner at a set of spatially offset positions located on a circle.

It would have been obvious to one of ordinary skill in this art at the time of invention to have at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values, as taught by the figures and specification of the copending application and as taught by Jaynes who shows in figure 4 that a sub-frame pixel value of a first sub-frame a depends on the pixel value of a second sub-frame pixel value b.

Claims 1-29 are provisionally rejected on the ground of nonstatutory double patenting over claims 1-30 of copending Application No. 10/947,762 in view of "Super-Resolution Composition in Multi-Projector Displays" by Jaynes et al. ("Jaynes"). This is a provisional double patenting rejection since the conflicting claims have not yet been patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of this application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values, and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values; and alternating

between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

Claim 1 of the copending application recites

A method of displaying an image with a display device having a plurality of defective pixels, the method comprising: selecting an offset between a first sub-frame and a second sub-frame using information associated with the plurality of defective pixels; **generating the first sub-frame and the second sub-frame using image data for the image; adjusting a first sub-frame pixel value in the first sub-frame associated with one of the plurality of defective pixels; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position, the second position displaced from the first position by an amount defined by the offset.**

It would have been obvious to one of ordinary skill in this art at the time of invention to have the first and the second sub-frames comprise a plurality of sub-frame pixel values as implied by claim 1 of the copending application, and at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values, as taught by the figures and specification of the copending application and as taught by Jaynes who shows in figure 4 that a sub-frame pixel value of a first sub-frame a depends on the pixel value of a second sub-frame pixel value b.

Claims 1-29 are provisionally rejected on the ground of nonstatutory double patenting over claims 1-26 of copending Application No. 10/996,083 in view of "Super-Resolution Composition in Multi-Projector Displays" by Jaynes et al. ("Jaynes"). This is a provisional double patenting rejection since the conflicting claims have not yet been

patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of this application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values, and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

Claim 1 of the copending application recites

A method of displaying an image with a display device having at least one defective display pixel, the method comprising: generating first, second, and third sub-frames using image data for the image, information that identifies the at least one defective display pixel, a first pixel offset associated with the second sub-frame, and a sub-pixel offset associated with the third sub-frame; and alternating between displaying the first sub-frame in a first position, displaying the second sub-frame in a second position spatially offset from the first position according to the first pixel offset, and displaying the third sub-frame in a third position spatially offset from the first position and the second position according to the sub-pixel offset.

It would have been obvious to one of ordinary skill in this art at the time of invention to have the first and the second sub-frames comprise a plurality of sub-frame pixel values, and at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values, as implied by claim 1 of the copending application and as taught by the figures and specification of the copending application and as taught by Jaynes who shows in figure 4 that a sub-frame pixel value of a first sub-frame a depends on the pixel value of a second sub-frame pixel value b.

Claims 1-29 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-33 of U.S. Patent No. 7,030,894 in view of "Super-Resolution Composition in Multi-Projector Displays" by Jaynes et al.

("Jaynes"). This is a provisional double patenting rejection since the conflicting claims have not yet been patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of this application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values, and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

Claim 1 of the U.S. Patent recites

A method of displaying an image, the method comprising: receiving image data for the image; buffering the image data for the image, including creating a frame of the image; defining a first sub-frame and at least a second sub-frame for the frame of the image from the image data, the second sub-frame being spatially offset from the first sub-frame; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position, wherein defining the second sub-frame further includes defining a third sub-frame and a fourth sub-frame for the frame of the image from the image data, the fourth sub-frame being spatially offset from the third sub-frame and the third sub-frame and the fourth sub-frame both being spatially offset from the first sub-frame and the second sub-frame, and wherein alternating between displaying the first sub-frame and displaying the second sub-frame further includes alternating between displaying the first sub-frame in the first position, displaying the second sub-frame in the second position, displaying the third sub-frame in a third position spatially offset from the first position and the second position, and displaying the fourth sub-frame in a fourth position spatially offset from the first position, the second position, and the third position.

It would have been obvious to one of ordinary skill in this art at the time of invention to have the first and the second sub-frames comprise a plurality of sub-frame pixel values, and at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values, as taught by the figures and specification of the U.S. Patent and as taught by Jaynes who shows in figure 4 that a sub-frame pixel value of a first sub-frame a depends on the pixel value of a second sub-frame pixel value b.

Claims 1-29 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-60 of U.S. Patent No. 7,034,811 in view of "Super-Resolution Composition in Multi-Projector Displays" by Jaynes et al. ("Jaynes"). This is a provisional double patenting rejection since the conflicting claims have not yet been patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of this application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values, and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.

Claim 1 of the U.S. Patent recites

A method of displaying an image with a display device including a plurality of display pixels, the method comprising: receiving image data for the image, the image data including individual pixels of the image; buffering the image data

and creating a frame of the image, the frame of the image including a plurality of columns and a plurality of rows of the pixels of the image; **defining a first sub-frame and at least a second sub-frame for the frame of the image, image data of the second sub-frame being offset from image data of the first sub-frame by an offset distance of at least one pixel; and displaying the first sub-frame with a first plurality of the display pixels and displaying the second sub-frame with a second plurality of the display pixels offset from the first plurality of the display pixels by the offset distance**, wherein at least one of the display pixels of the display device is a defective display pixel, and wherein displaying the first sub-frame with the first plurality of the display pixels and displaying the second sub-frame with the second plurality of the display pixels includes diffusing an affect of the defective display pixel over the image.

It would have been obvious to one of ordinary skill in this art at the time of invention to have the first and the second sub-frames comprise a plurality of sub-frame pixel values, and at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values, as taught by the figures and specification of the U.S. Patent and as taught by Jaynes who shows in figure 4 that a sub-frame pixel value of a first sub-frame a depends on the pixel value of a second sub-frame pixel value b.

Claims 1-29 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-37 of U.S. Patent No. 7,109,981 in view of "Super-Resolution Composition in Multi-Projector Displays" by Jaynes et al. ("Jaynes"). This is a provisional double patenting rejection since the conflicting claims have not yet been patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of this application recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating first and

second sub-frames, wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values, and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values; **and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position.**

Claim 1 of the U.S. Patent recites

A method of displaying an image with a display device, the method comprising: receiving image data for the image; generating a first sub-frame and a second sub-frame corresponding to the image data, the first and the second sub-frames generated based on minimization of an error between the image data and a simulated image; and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position wherein the simulated image is based on upsampling of the first and second sub-frames, thereby generating upsampled sub-frame data.

It would have been obvious to one of ordinary skill in this art at the time of invention to have the first and the second sub-frames comprise a plurality of sub-frame pixel values, and at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values, as taught by the figures and specification of the U.S. Patent and as taught by Jaynes who shows in figure 4 that a sub-frame pixel value of a first sub-frame a depends on the pixel value of a second sub-frame pixel value b.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2 and 4-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Application Publication Number 2004/0027363 published February 12, 2004 by Allen in view of "Super-Resolution Composition in Multi-Projector Displays" by Jaynes et al. ("Jaynes").

Allen discloses receiving image data for the image (image 12 of figure 1); generating first and second sub-frames (sub-frame generation 36), wherein the first and the second sub-frames comprise a plurality of sub-frame pixel values (figure 2C), and wherein at least a first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values (figure 7E); and alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position (image shifter 38).

Although Allen does not explicitly state that the first one of the plurality of sub-frame pixel values is calculated using the image data and at least a second one of the plurality of sub-frame pixel values, Jaynes in figure 4 says that pixel values a_1 and b_1 must be determined so that $k_1 = a_1 + b_1$.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have at least a first one of the plurality of sub-frame pixel values calculated using the image data and at least a second one of the plurality of sub-frame pixel values because the value of b_1 influences the values of k_1 , k_2 , k_3 , and k_4 , which

means that the pixel values for a single sub-frame are not independent as taught by Jaynes in figure 4.

For claim 2, Allen discloses generating third and fourth sub-frames, the first, the second, the third, and the fourth sub-frames comprising the plurality of sub-frame pixel values; and alternating between displaying the first sub-frame in the first position and displaying the second sub-frame in the second position spatially offset from the first position, displaying the third sub-frame in a third position spatially offset from the first position and the second position, and displaying the fourth sub-frame in a fourth position spatially offset from the first position, the second position, and the third position as shown in figures 7A through 7E.

For claim 4, Jaynes discloses the first one of the plurality of sub-frame pixel values is calculated using the image data, the second one of the plurality of sub-frame pixel values, and a third one of the plurality of sub-frame pixel values that is associated with the fourth sub-frame.

For claim 5, Jaynes discloses a region of influence associated with the first one of the plurality of sub-frame pixel values comprises a number of pixel values that corresponds to a number of iterations used to generate the first and second sub-frames.

For claim 6, Allen and Jaynes each disclose generating the first and the second sub-frames using a simulation kernel.

For claim 7, Allen in figure 23 discloses generating the first and the second sub-frames using an error kernel.

For claim 8, Jaynes in figures 1 and 2 discloses the image comprises a plurality of image pixels, wherein each of the plurality of sub-frame pixel values corresponds to a sub-frame pixel that is centered with respect to one of the plurality of image pixels.

For claim 9, Jaynes and Allen each disclose generating the first and the second sub-frames, wherein the first and the second sub-frames comprise the plurality of sub-frame pixel values, and wherein at least the first one of the plurality of sub-frame pixel values is calculated using the image data, at least the second one of the plurality of sub-frame pixel values, and a plurality of sharpening factors.

For claim 10, Jaynes and Allen each disclose a plurality of pixels at a first resolution, and wherein the first and the second sub-frames comprise a second plurality of pixels at a second resolution less than the first resolution.

For claim 11, Allen shows, in figure 1, a buffer 22 adapted to receive image data for the image; an image processing unit 24 configured to generate first and second sub-frames comprising a plurality of rows of sub-frame pixel values, wherein each of the sub-frame pixel values in each of the plurality of rows is calculated using the image data and at least one sub-frame pixel value from a previous one of the plurality of rows; and a display device 26 adapted to alternately display the first sub-frame in a first position and the second sub-frame in a second position spatially offset from the first position.

Although Allen does not explicitly state that each of the sub-frame pixel values in each of the plurality of rows is calculated using the image data and at least one sub-frame pixel value from a previous one of the plurality of rows, Jaynes in figure 4 says

that pixel values a_1 from a first row and b_1 from a second row must be determined so that $k_1 = a_1 + b_1$.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to calculate the value of a sub-frame pixel value in row b using a sub-frame pixel value in row a because the value of a_1 influences the value of k_1 , which means that the pixel values for a single sub-frame are not independent as taught by Jaynes in figure 4.

For claim 12, Jaynes and Allen each disclose the image processing unit is configured to generate the first and the second sub-frames using a simulation kernel.

For claims 13-16, Jaynes and Allen do not disclose expressly the specific coefficient values of the simulation kernel.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to replace the coefficients in the simulation kernels of Allen or Jaynes with those of claims 13-16. Applicant has not disclosed that these specific numbers provide an advantage, are used for a particular purpose or solve a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with the kernels used in the prior art or those disclosed by applicant, because both the prior art and the claimed invention perform the same function of creating a superresolution composition from a simulation kernel.

Therefore, it would have been obvious to one of ordinary skill in this art to modify the prior art with the specific coefficients disclosed by applicant to obtain the invention as specified in claims 13-16.

For claim 17, Allen and Jaynes each disclose the image processing unit is configured to generate the first and the second sub-frames using an error kernel.

For claims 18, Jaynes and Allen do not disclose expressly the specific coefficient values of the error kernel.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to replace the coefficients in the error kernels of Allen or Jaynes with those of claim 18. Applicant has not disclosed that these specific numbers provide an advantage, are used for a particular purpose or solve a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with the kernels used in the prior art or those disclosed by applicant, because both the prior art and the claimed invention perform the same function of creating a superresolution composition from an error kernel.

Therefore, it would have been obvious to one of ordinary skill in this art to modify the prior art with the specific coefficients disclosed by applicant to obtain the invention as specified in claim 18.

For claim 19, Allen and Jaynes each disclose the image processing unit is configured to generate third and fourth sub-frames comprising the plurality of rows of sub-frame pixel values, wherein each of the sub-frame pixel values in each of the plurality of rows is calculated using the image data and at least one sub-frame pixel value from a previous one of the plurality of rows.

For claim 20, Allen discloses means for receiving image data corresponding to the image 12; means for generating a plurality of rows of initial values 34 using the image data; means for accessing 24 a row of history values generated using the image data; and means for generating a sub-frame pixel value 36 using the row of history values and the plurality of rows of initial values (see figures 13A-15 which modify the

Allen does not explicitly disclose accessing a row of history values generated using the image data and generating a sub-frame pixel value using the row of history values and the plurality of rows of initial values, but Jaynes discloses means for accessing a row of history values generated using the image data (the outermost boundary pixels form a row of pixel values that can no longer be adjusted); and means for generating a sub-frame pixel value using the row of history values and the plurality of rows of initial values (the remaining component image pixels, p , are then visited in random order in each image and are corrected by reducing an error function. Starting from the periphery, pixels are iteratively adjusted according to the algorithm in all component images that can influence the value of a high-resolution target).

It would have been obvious to one of ordinary skill in the art at the time of the invention to determine a final sub-frame pixel value using initial values and history values as taught by Jaynes to reduce global error.

For claim 21, Jaynes and Allen each disclose a number of values in the row of history values and each of the plurality of rows of initial values corresponds to a number of iterations associated with generating the sub-frame pixel value.

For claim 22, Jaynes and Allen each disclose the row of history values and the plurality of rows of initial values comprise a plurality of columns, wherein a number of the plurality of columns corresponds to a number of iterations associated with generating the sub-frame pixel value.

For claim 23, Jaynes and Allen each disclose the means for generating the sub-frame pixel value includes means for generating the sub-frame pixel value using the row of history values, the plurality of rows of initial values, a simulation kernel, and an error kernel.

For claim 24, Jaynes and Allen each disclose the means for generating the sub-frame pixel value includes means for generating the sub-frame pixel value using the row of history values, the plurality of rows of initial values, and a simulation kernel.

For claim 25, Allen discloses receiving image data corresponding to the image 12; generating a first plurality of initial values associated with a first pixel which corresponds to a first one of the plurality of sub-frames using the image data 34; generating a first sub-frame pixel value 36 using the image data and the first plurality of initial values, wherein the first sub-frame pixel value comprises a first history value; generating a second plurality of initial values associated with a second pixel which corresponds to a second one of the plurality of sub-frames using the image data 34.

Allen does not explicitly disclose that the first sub-frame pixel value is a first history value, and generating a second sub-frame pixel value using the image data, the second plurality of initial values, and the first history value. Jaynes discloses an

iterative algorithm that determines initial values, revises the initial values, and calculates final values using initial values and revised values. It would have been obvious to one of ordinary skill in the art at the time of the invention to calculate a second sub-frame pixel value using the image data, the second plurality of initial values, and a history value in order to reduce global error as taught by Jaynes.

For claim 26, Jaynes and Allen each disclose generating a third plurality of initial values associated with a third pixel which corresponds to a third one of the plurality of sub-frames using the image data; generating a third sub-frame pixel value using the image data and the third plurality of initial values, wherein the third sub-frame pixel value comprises a second history value; and generating the second sub-frame pixel value using the image data, the second plurality of initial values, the first history value, and the second history value.

For claim 27, Jaynes and Allen each disclose generating a fourth plurality of initial values associated with a fourth pixel which corresponds to a fourth one of the plurality of sub-frames using the image data; and generating a fourth sub-frame pixel value using the image data, the fourth plurality of initial values, and the first history value.

For claim 28, Jaynes and Allen each disclose the first sub-frame pixel value and the third sub-frame pixel value comprise a first row of a sub-frame image, and wherein the second sub-frame pixel value and the fourth sub-frame pixel value comprise a second row of the sub-frame image.

For claim 29, Jaynes and Allen each disclose the first, the second, the third, and the fourth pixels are centered with respect to a corresponding image pixel in the image.

Response to Arguments

Applicant argues that the publication date of U.S. Patent Number 7,034,811 issued to Allen is later than the publication date of the corresponding U.S. Application Number 10/242,195 filed by Allen and published on February 12, 2004. This argument is persuasive, the reference to the Allen patent in the rejection under 35 USC 103 has been replaced by reference to the corresponding publication of the Allen application that subsequently issued into the Allen patent.

Even though the current rejection remains identical to the previous rejection, with the exception of changing the patent number to the publication number, applicant asked for a non-final rejection. As a courtesy to applicant, this request has been granted.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey S. Smith whose telephone number is 571 270-1235. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Application/Control Number:
10/821,130
Art Unit: 2624

Page 33

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JSS
February 20, 2008

JINGSE WU
SUPERVISORY PATENT EXAMINER

